

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Kazuo KUBOTA et al.

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Examiner: D.E. Cordray

37 C.F.R. 1.132 DECLARATION OF ZEMBEI MEIWA

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Zembei MEIWA, the undersigned, declare that:

I am one of the co-inventors of the invention as described and claimed in the above identified patent application.

I have reviewed the above-identified application as well as the Office Action mailed January 7, 2008.

I have carried out the following additional tests and procedures, the results of which are described herein.

Comparative Examples 17 and 18

Polymer emulsions were prepared by the following procedures. The obtained polymer emulsions were tested in the same way as shown in the application for stiffness ratio and bulk ratio.

Materials of the polymer emulsions and test results are shown in **Table 5**, hereto attached, together with the data of Table 2 of the present specification.

It is noted from the test results that Comparative Examples 17 and 18, using an amphoteric starch, are inferior to Example 21 to 28, in particular Example 27, using a cationic starch, in view of stiffness ratio and bulk ratio.

• Emulsion I'

A 2-L flask equipped with a reflux condenser, a dropping funnel, a thermometer, a nitrogen inlet and a stirrer was charged with 70 g cationic polyvinyl alcohol [PVA C-118, N% = 0.3%; the viscosity of 7% aqueous solution: 67 mPa·s (50°C, Brookfield viscometer, Rotor No. 1, 60 rpm)] and 570 g ion exchange water, and the mixture was dissolved by heating at 90°C. After cooling, 30 g EMULGEN 150 (nonionic surfactant, 20% aqueous solution, manufactured by Kao Corporation), and 11.4g of 4% tartaric acid (reagent, manufactured by Wako Pure Chemical Industries) were added thereto (after this addition, the pH of the whole system was 4.0), then stirred at 120 rpm and heated at 60°C for 30 minutes while nitrogen was blown into the reaction mixture.

Then, 20 g vinyl acetate (manufactured by Shin-Etsu Sakusan Vinyl Co., Ltd.) and a solution of 0.2 g initiator (V-50, azo-based initiator, manufactured by Wako Pure Chemical Industries, Ltd.) in 10 g ion exchange water were added thereto and kept for 15 minutes. Then, the mixture was heated to 75°C, and a mixture of 380 g vinyl acetate and a solution of 0.8 g initiator (V-50) in 160 g ion exchange water were added dropped thereto over 3 hours through separate dropping funnels, respectively, and the mixture was polymerized. Then, the reaction mixture was heated to 82°C, aged for 1 hour, cooled and recovered.

• Emulsion XIX

An emulsion was obtained in the same manner as Emulsion I' except that 70g cationic polyvinyl alcohol [PVA C-118] was replaced by ^{80g} modified starch GRC-20T (amphoteric starch, manufactured by Oji Corn starch, Ltd.). Emulsion XIX had a solid content of 32.7% and an average particle diameter of 0.58 μm.

April 7, 2000
Z.M

• Emulsion XX

An emulsion was obtained in the same manner as Emulsion I' except that 70g cationic polyvinyl alcohol [PVA C-118] was replaced by ^{80g} modified starch KH-1000 (amphoteric starch, manufactured by Oji Corn starch, Ltd.). Emulsion XX had a solid content of 32.7% and an average particle diameter of 0.61 μ m.

April 7, 2008
Z.M

I hereby declare that all statements made herein of my own knowledge are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By: 明和善平

Zembei MEIWA

Date: April 7, 2008

Attachment: Table 5

Table 5

Cationic polymer (A)			Polymer particle (B)				Emulsion				Performance of manufactured paper			
Kind ¹⁾	N% (%)	Viscosity (mPa·s)	Monomer composition ²⁾ (%)			Tg (°C)	No.	Addition amount of (A) ³⁾ (%)	Solid content (%)	Average particle diameter	Amount of intensity added agent (%)	improvement ratio of strength (%)	improvement ratio of bulk (%)	
			Monomer (1)	Monomer (2)	Monomer (3)									
Example														
21	ACE K-500	0.2	4650	VAc 94.9	MAA 2.32	DMAAm 2.78	36	VI	20	23.4	13.1	0.5	22.3	0.94
22	ACE K-500	0.2	4650	VAc 94.9	MAA 2.32	DMAAm 2.78	36	VI	20	23.4	13.1	1.0	12.5	1.87
23	Cationic starch A	0.5	260	VAc 94.9	MAA 2.32	DMAAm 2.78	36	VII	41	23.7	0.42	0.5	12.1	5.86
24	Cationic starch A	0.5	260	VAc 94.9	MAA 2.32	DMAAm 2.78	36	VII	41	23.7	0.42	5.0	7.8	6.32
25	Cationic starch A	0.5	260	VAc 98.55	DMAAm 1.45	—	33	XII	10	29.5	0.43	0.5	7.8	5.20
26	Cationic starch A	0.5	260	VAc 98.55	DMAAm 1.45	—	33	XII	10	29.5	0.43	5.9	9.1	6.90
27	Cationic starch A	0.5	260	VAc 100	—	—	32	XVIII	315	7.9	0.20	4.0	11.8	4.9
28	Cationic starch A	0.6	260	VAc 94.9	MAA 2.32	DMAAm 2.78	36	XX	49	13.1	0.43	1.6	10.5	6.2
Comparative example														
1	No addition	—	—	VAc 94.9	MAA 2.32	DMAAm 2.78	33	XIV	—	17.7	1.85	5.0	-2.4	-0.06
2	PVA-2	0.3	11	VAc 99.13	AA 0.87	—	33	XV	53.5	28.6	4.37	0.5	1.6	0.85
3	PVA-2	0.3	11	VAc 99.13	AA 0.87	—	33	XV	53.5	28.6	4.37	5.0	4.8	1.34
4	PVA-1	—	15	St 95	GNAC 5	—	>100	XVI	10	41.5	4.35	0.5	0.7	0.71
5	PVA-1	—	15	St 95	GNAC 5	—	>100	XVI	10	41.5	4.35	1.0	-9.4	0.1
6	PVA-1	—	15	St 95	GNAC 5	—	>100	XVI	15	32.0	5.52	0.5	-5.8	1.45
7	PVA-1	—	15	St 95	GNAC 5	—	>100	XVI	15	32.0	5.52	5.9	-11.2	1.33
17	Amphiphilic starch QAC-201	—	250	VAc 100	—	—	32	XX	20	32.7	0.58	0.5	-7.9	1.50
18	Amphiphilic starch KCI-1000	—	4950	VAc 100	—	—	32	XX	20	32.7	0.61	0.5	-0.9	1.30